

## **Group Firing System for Firework Unit**

### **Field of the Invention**

The present invention relates to a group firing system for connectable firework, which is in the field of pyrotechnics.

### **Background of the Invention and Prior Art**

Fireworks as a kind of festivity products is enjoyed by people, especially, used in grand ceremony and ceremonial festival. It can not be replaced by any other forms, such as the light, sound, and color. It could not only warmly stand out the main subject, but also can have endless imagination to each person. But such kind of firework-display party is limited by some professional conditions, thus, could not be realized by normal consumers. The main reason is that the conventional firework unit is unattached with each other. It could not be connected together by normal consumers.

Therefore, if we could change the structure of the firework unit, the people could operate the firework display party by themselves.

### **Brief Description of the Invention**

The object of the present invention is to provide a new firing system for the firework unit. Thus, the consumers can arrange the firework display by themselves, then it could bring more attractive effect than before.

The group firing system for firework unit of the present invention is as follows:

- A. 1-2 paper fuse tubes is provided within the firework unit, which links with the fus of

the firework unit, each end of the paper fuse tubes has socket; the fuse is provided within the paper fuse tubes;

- B. the sockets of the firework units are connected into a firework group through soft fuse hoses.

Preferably, the paper fuse tubes in the firework unit is connected to the adjacent one in series, that is, one end of the lower paper fuse tube in firework unit is connected with soft fuse hose, and one end of the upper paper fuse tube, thereof is connected with the lower paper fuse tube in another firework unit the connection is repeated.

Preferably, each of the two adjacent firework units are connected with the lower paper fuse tube thereof through the soft fuse hose, that is, the firework units are connected in parallel.

Preferably, the fuse in the paper fuse tube of the firework unit is connected to a firstly firing shot tube through a derivative fuse, and the shot tube is connected to the other shot tubes in turn through inner fuse.

Preferably, the fuse in the paper fuse tube is connected to a final firing shot tube through a derivative fuse.

With the structure mentioned, the conventional firework units can be fired in a group without the limitation of the place and the time. The consumer has more greatly enjoyable at sight of display fireworks.

### **Brief Description of the Drawings**

Figure 1 shows the structure of this invention;

Figure 2 shows inner structure of firework unit;

Figure 3 shows the series connection structure;

Figure 4 shows the parallel connection structure;

Figure 5 shows the sectional view taken along line aa' in Figure 2;

Figure 6 shows the sectional view taken along line bb' in Figure 2;

Figure 7 shows the structure of firework unit provided with single one paper fuse tube ;

In the figures:

1, shot tube; 2, upper paper fuse tube; 2', lower paper fuse tube; 3, sockets; 6, fuse; 6', derivative fuse; 7, inner fuse.

A<sub>1</sub>-A<sub>4</sub>, B<sub>1</sub>-B<sub>9</sub>, C<sub>1</sub>-C<sub>2</sub> indicate three kinds of fireworks unit with different shapes;

L<sub>1</sub>-L<sub>14</sub> indicate soft fuse hose.

### Detailed Description of Preferred Embodiments

The present group firing system is developed on the conventional firework units to make it possible to connect the firework units for group display show.

As shown in the attached Figure 1, the connection firework group is composed of three sets of the different fireworks units A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub>, A<sub>4</sub>, B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>, B<sub>4</sub>, B<sub>5</sub>, B<sub>6</sub>, B<sub>7</sub>, B<sub>8</sub>, B<sub>9</sub>, C<sub>1</sub>, C<sub>2</sub>. These different firework units are linked by 1 to 2 paper fuse tubes 2, 2' within their inner structure and some soft fuse hoses L with fuses outside to form a display group. If firework unit B<sub>1</sub> shown in the upper portion in the figure is taken as the firstly ignited firework in the group, it can be known that firework unit B<sub>1</sub> is serially connected with firework units B<sub>2</sub>, A<sub>4</sub>, C<sub>1</sub>, A<sub>1</sub> through the paper fuse tubes and the soft fuse hoses L<sub>1</sub>, L<sub>2</sub>, L<sub>3</sub>, L<sub>4</sub>. Since A<sub>1</sub> has two paper fuse tube 2, 2', L<sub>4</sub> is connected to B<sub>4</sub>, B<sub>5</sub>, B<sub>6</sub>, A<sub>2</sub> through soft fuse hose L<sub>6</sub>, L<sub>7</sub>, L<sub>8</sub>, L<sub>9</sub> with the lower paper fuse tube 2', while A<sub>1</sub> is connected to B<sub>3</sub> through soft fuse hose L<sub>5</sub> with its upper paper fuse tube 2. By the same way, after the soft fuse tube L<sub>9</sub> is connected to A<sub>2</sub>, it also is connected to B<sub>7</sub> through paper fuse tube ) and L<sub>10</sub>, at the same time, it is connected to C<sub>2</sub> through L<sub>11</sub> and upper paper fuse tube ), and is connected to A<sub>3</sub>, B<sub>8</sub>, B<sub>9</sub> through L<sub>12</sub>, L<sub>13</sub>, L<sub>14</sub>.

It can be known that the conventional firework units can be combined into various connection systems by changing the structure thereof, that is, it can be connected in series connection or parallel connection. The resulted firing pattern may be in block-shape or

characters-shape.

Certainly, the reason that we could carry out this system is that we have changed the firework' structure. It is composed of some shot tubes 1. It is installed with 1-2 paper fuse tubes 2,2'. And the structure between paper fuse tube 2,2' and the shot tube 1 as shown in figures 5, 6:

When two paper fuse tubes 2, 2' with the fuse 6 are provided in the firework unit, the fuse 6 in the lower paper fuse tube 2' links the first shot tube A, at the same time, it links with another firework unit through lower paper fuse tube 2', its socket 3, soft fuse hose L.

The structure inside firework unit as we mentioned: its tubes are linked together as sequence A,B,C.....R,S,T through inner fuse 7. And the final shot tube T links with fuse 6 in the paper fuse tube 2 through the derivative fuse 6'.

Therefore, the basis connection system between the paper fuse tube 2,2' and the shot tubes 1 is as follows:

With the derivative fuse 6' of the fuse 6 within the paper fuse tube 2', which is firstly links with the first shot tube A, then links with inner fuse 7 to connect the shot tubes A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T with together in series. This connection mode is substantively the same as that of conventional firework unit connected one by one with inner fuse 7. The difference therebetween is that: the derivative fuse 6' in the final shot tube is connected with the fuse 6 in the upper paper fuse tube 2.

Thus, there are two firing modes in series if the firework units are operated with the structure of the present invention.

1. Two adjacent firework units link together with the lower paper fuse tubes 2' and are set off (Fig. 4).

In this occasion, when the fuse 6 within the paper fuse tube 2' is fired, it transfers the fire to the next firework unit, meanwhile it fires the shot tubes A, B, C,.....R, S, T through the derivative fuse 6' of the fuse 6. Several adjacent firework units can be fired in short time, that is, in parallel firing mode.

2. Two adjacent firework unit link together with the upper paper fuse tube 2 and the lower paper fuse tube 2' (Fig. 3) and set off.

In this occasion, when the fuse 6 within the paper fuse tube 2 is fired, it transfers the fire to the next firework unit. Otherwise, (if the fire is not directly transferred to the next firework unit) it fires the shot tube T in the firework unit through the derivative fuse 6' of the fuse 6, and the shot tubes A, B, C,.....R, S, T will be fired through the inner fuse 7. Finally, the fire is transferred to the new firework unit through the fuse 6 in the lower paper fuse tube 2' in series firing mode, that is, the next firework unit will not be fired until the preceding firework unit is burned out.

When the fuse 6 inside the Upper Paper Fuse Tube (2) was fired, it would transfer the fire to the next one. On the other hand the fuse (6') inside the Paper Fuse Tube (6) would light the Shot Tube T, and it would display from S, R, Q,.....C, B, A, finally the fire would transfer to next one through the Below Paper Fuse Tube (2'), therefore, the fireworks would be fired one by one, that is serial system.

Furthermore, the present invention would be the structure as shown in Figure 7. In which, there is just one paper fuse tube in the firework unit, which is used to form series connection. Therefore, the firework unit with the one paper fuse tube is just fired together with the other firework units in parallel firing mode.